TX210 SERIES

Programmable In-head Universal Temperature Transmitter

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1.0 DESCRIPTION

The transmitter is a second generation 'Smart' in-head temperature transmitter that accepts any commonly used temperature sensor, slidewire transducer or millivolt signal and converts the output to the industry standard (4 to 20) mA transmission signal. The software package RCPW can be used to program the unit.

2.0 SPECIFICATION @ 20 °C

2.1 RTD INPUT (Pt100)

Sensor Range		(-200 to 850) °C (18 to 390) Ω
Minimum Span*1		25 °C
Linearisation		BS EN60751 (IEC 751) BS 1904 (DIN 43760) JISC 1604 CUSTOM [X]*3
Basic Measurement Accuracy*2		± 0.01 % FRI ± 0.05 % Rdg (FRI = Full Range Input)
Thermal Drift	Zero	0.008 °C/°C
	Span	0.01 %/°C
Excitation Current		(300 to 550) µA
Maximum Lead Resistance		50 Ω/leg
Lead Resistance Effect		0.002 °C/Ω

2.2 THERMOCOUPLE INPUT

SENSOR RANGES

Thermocouple Type	Measuring Range*4 °C	Minimum Span*1 °C
TC Type K	-200 to 1370	50
TC Type J	-200 to 1200	50
TC Type T	-210 to 400	25
TC Type R	-10 to 1760	10
TC Type S	-10 to 1760	100
TC Type E	-200 to 1000	50
TC Type L	-100 to 600	25
TC Type N	-180 to 1300	50
TC Type [X]*3	User defined	

Linearisation		BS 4937 / IEC 584, EN60584
Basic Measurement Accuracy*2		± 0.04 % FRI ± 0.04 % RDG or 0.5 °C (whichever is greater)
Thermal Drift	Zero	0.1 µV/°C
	Span	0.01 %/°C
Cold Junction Error		± 0.5 °C
Cold Junction Tracking		0.05 °C/°C
Cold Junction Range		(-40 to 85) °C

2.3 MILLIVOLT INPUT*5

Input		Voltage source
Range		(-10 to 75) mV
Characterisation		Linear Custom [X]*3, 4th order polynomial
Minimum Span*1		5 mV
Basic Measurement Accuracy*2		± 10 µV ± 0.07 % Rdg
Input Impedance		10 MΩ
Thermal Drift	Zero	0.1 µV/°C
	Span	0.01 %/°C

2.4 SLIDEWIRE INPUT*5

Input	3 wire potentiometer
Resistance Range	(10 to 390) Ω (end to end). Larger values can be accommodated by external resistor.
Characterisation	Linear Custom [X]*3, 4th order polynomial
Minimum Span*1	5 %
Basic Measurement Accuracy*2	0.1 % FRI
Temperature Drift	0.01 %/°C

2.5 OUTPUT

Output Range	(4 to 20) mA (> 3.8 to < 20.2) mA
Maximum Output	23 mA
Accuracy	± 5 µA
Voltage Effect	0.2 µA/V
Thermal Drift	1 µA/°C
Supply Voltage	(10 to 35) V
Maximum Output Load	[(Vsupply -10)/20] kΩ (e.g 700 Ω @ 24 V)

*NOTES:

1. Any span may be selected, full accuracy is only guaranteed for spans greater than the minimum recommended.
2. Basic measurement accuracy includes the effects of calibration, linearisation and repeatability.
3. Customer linearisation requirements are available pre-programmed at the factory, contact your supplier for details.
4. Consult thermocouple reference standards for thermocouple material limitation.
5. If the unit is to be configured for either millivolts or slidewire input, the following procedure should be followed. Configure unit for **RTD** with **BS1904** linearisation (Not EN60751) and up load to unit. The unit can now be configured for millivolts or slidewire input.

2.6 GENERAL

Input/Output Isolation	500 VAC rms (galvanically isolated)
Update Time	250 ms maximum
Time Constant (Filter Off)	< 1 s (Time to reach 63 % final value)
Filter Factor Programmable	Off, 2 s, 10 s or adaptive
Warm up Time	120 s to full accuracy

ENVIRONMENTAL

Ambient Operating Range	(-40 to 85) ºC
Ambient Storage Temperature	(-50 to 100) ºC
Ambient Humidity Range	(10 to 90) % RH non condensing

APPROVALS

EMC	BS EN61326

MECHANICAL

Enclosure	DIN standard terminal block size
Material	ABS
Weight	35 g
Dimensions	(43 x 21) mm

COMMUNICATIONS

PC Interface	RS232 via configurator
Minimum Output Load	250 Ω for 'In loop' programming
Maximum Cable Length	1000 m
Configurable Parameters	Sensor type: Burnout: ºC/ºF: Output: Hi/Lo: Filter: Tag: User offset
Comms Protocol	ANSI X3.28 1976
Data Rate	1200 baud

2.7 SEM210X VERSION - FOR USE IN POTENTIALLY EXPLOSIVE ATMOSPHERES

2.7.1 ATEX CERTIFICATE

The TX210, has been issued with a EC-type examination certificate, confirming compliance with the European ATEX directive 94/9/EC for:

INTRINSIC SAFETY II 1 G EEx ia IIC T4…T6.

The equipment bears the Community Mark and subject to local codes of practice, may be installed in any of the European Economic Area (EEA) member countries. The SEM210X housing is coloured light blue to identify the equipment as suitable for Hazardous area use. The equipment must be installed and maintained in accordance with local requirements for electrical equipment for use in potentially explosive atmospheres, e.g EN60079-14 & EN60079-17. This instruction sheet describes installation which conforms with BS EN60079-14 & BS EN60079-17 Electrical Installation in Hazardous Areas. When designing systems outside the UK, the local Code of Practice should be consulted.

COMMON INFORMATION

Manufacturer	Global Ltd
Type Number	TX210
CE Marking	CE 0891
Explosive Protection Marking	

(TYPE ia) INTRINSIC SAFETY

II 1	Equipment group and category
G	Type of explosive atmosphere (Gas)
EEx ia IIC T4..T6	Intrinsic safety information
TRL03ATEX21032 X	Certificate reference

2.7.3 SPECIAL CONDITIONS FOR SAFE USE

As indicated by the Certificate Reference "X" suffix, special conditions apply for safe use for both intrinsic safety and energy limitation applications. They are as follows:

ZONES, GAS GROUPS, AND T RATING.
When connected to a approved system the SEM210X may be installed in:

Zone 0	Explosive gas air mixture continuously present
Zone 1	Explosive gas air mixture likely to occur in normal use
Zone 2	Explosive gas air mixture not likely to occur and if it does, it will only occur for a short time.

Be used in gas groups:

Group A	Propane
Group B	Ethylene
Group C	Hydrogen

Allowable temperature classification/ambient temperature:

INTRINSIC SAFETY (Type ia)

CLASS		AMBIENT TEMPERATURE RANGE °C
T1	450°C	-25 to 85
T2	300°C	-25 to 85
T3	200°C	-25 to 85
T4	135°C	-25 to 85
T5	100°C	-25 to 50
T6	85°C	-25 to 40

2.7.4 ENVIRONMENTAL PROTECTION

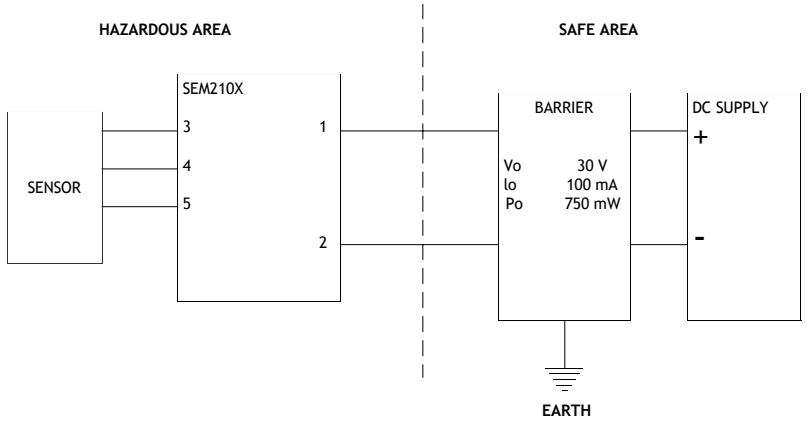
This equipment must be housed in an enclosure which provides a degree of protection of at least IP54. The enclosure must be suitable for the atmosphere and environment in which it is installed. (e.g. If of a plastic material, must be resistant to chemical corrosion, UV light, temperature, humidity, etc).

2.7.5 MAINTENANCE

This intrinsically safe equipment contains no user serviceable, adjustable or replaceable parts. No attempt should be made to repair a faulty TX210X transmitter, all units must be returned to the manufacture for repair or replacement. Attempt service or replacement of parts may invalidate the explosive protection features of the equipment.

2.8 CONNECTION DIAGRAM

They equipment must be electrically connected as shown below:



SEM210X WORKING PARAMETERS

Ui	30 V
I i	100 mA
Pi	750 mW
Ci	10 nF
Li	0 µH

3.0 INSTALLATION

3.1 MECHANICAL

The transmitter is mounted using two 5.5 mm diameter holes, on standard 33 mm fixing centres and will fit a DIN standard termination head. The transmitter should be installed with adequate protection from moisture and corrosive atmospheres.

Care must be taken when locating the transmitter to ensure the ambient temperature remains within the specified operating range. Figure 1 shows the mechanical layout and a typical application of the transmitter mounted inside a termination head enclosure, with sensor wires entering through the centre of the transmitter body.

Figure 1

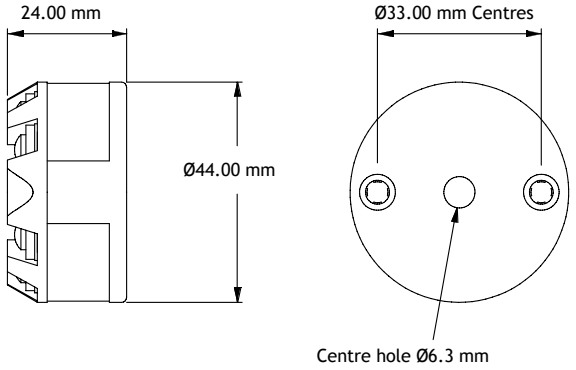
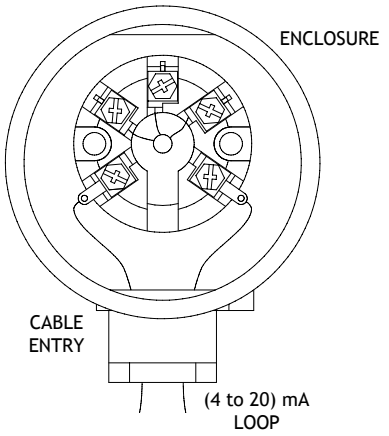


Figure 2



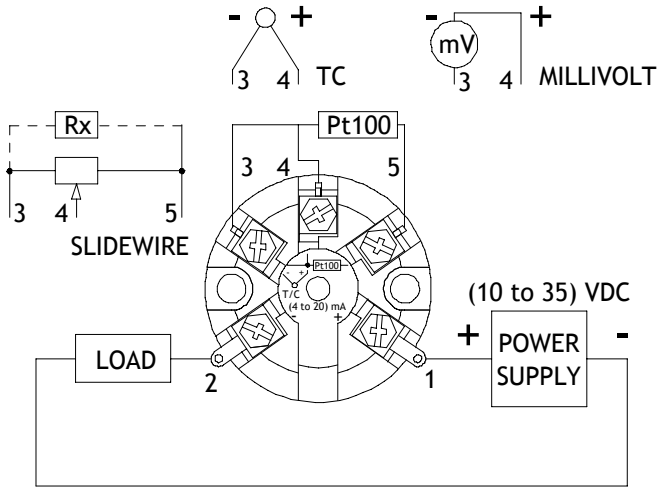
3.2 ELECTRICAL

Connections to the transmitter are made to the screw terminals provided on the top face. No special wires are required for the output connections, but screened twisted pair cable are the most suitable for long runs. It is recommended that screened cable is used for the three input signal wires for cable runs greater than one metre. All three input wires must have the same core diameter to maintain equal lead resistance in each wire. A Ø4.5mm hole is provided through the centre of the transmitter to allow sensor wires to be threaded through the transmitter body direct to the input screw terminals. The screw terminals have been designed to allow all connection wires to enter from an inner or an outer direction.

Figure 3 shows the method of connection to provide a (4 to 20) mA current loop output. The Pt100 sensor shown would normally take the form of a probe assembly with a three wire connection. The output loop has a voltage power supply used to provide loop excitation. The load symbol represents other equipment in the loop, normally indicators, controllers or loggers. Care must be taken when designing the (4 to 20) mA circuit to ensure that the total voltage requirements of all the equipment in the loop added together, does not exceed the power supply voltage. If a number of instruments are connected in the loop, ensure that only one instrument is tied to ground. Grounding the loop at two points will cause a short circuit of part of the loop leading to measurement errors.

To guarantee CE compliance, sensor leads must be less than 3 m long and the transmitter housing should prevent access to the transmitter during normal operation.

Figure 3



* Fit Rx for all potentiometers with end to end resistance > 390 Ω. Such that total end to end resistance is > 200 Ω < 390 Ω.

ALSO AVAILABLE:

- Smart In Head Temperature Transmitters
- DIN Rail Mounted Temperature Transmitters
- Panel & Field Temperature Indicators
- Temperature Probes
- Trip Amplifiers
- Signal Conditioners
- And many other products

For further information on all products:

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